

METHODS FOR PRODUCING LOW-K CDO FILMS WITH LOW RESIDUAL STRESS

ABSTRACT

Methods of preparing a carbon doped oxide (CDO) layer with a low dielectric constant and low residual stress are provided. The methods involve, for instance, providing a substrate to a deposition chamber and exposing it to a chemical precursor having molecules with at least one carbon-carbon triple bond, followed by igniting and maintaining a plasma in a deposition chamber using radio frequency power having high and low frequency components or one frequency component only, and depositing the carbon doped oxide film under conditions in which the resulting dielectric layer has a compressive stress or a tensile stress of not greater than, e.g., about 50 MPa, and dielectric constant of less than 3.